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ABSTRACT

A study examined an experimental curriculum developed to enhance students' literacy and social studies skills. Videodisc and text materials (the films "Young Sherlock Holmes" and "Oliver" and stories by Charles Dickens and Conan Doyle) were used to create a "macrocontext" for learning. The curriculum evaluation project spanned a three-year period; findings reported here were collected during the second and third years. During the second year, two classes of students participated. Students were assigned to either an experimental or comparison group with classes taught by the project staff. During the third year, three classes of fifth-grade students participated in the study and were taught by regular classroom teachers. Results from the second year indicated that integrated instruction using macrocontexts had the greatest benefit on lower achieving students. The results of the average students indicated that there may be greater forgetting for students taught using a traditional approach than for students using a macrocontextual approach. Results from the third year indicated that the effects are replicable across teachers and from experimental to field settings. Students in each of the three classes showed significant increases in their knowledge of the time period. Results indicated that macrocontext instruction is relatively more effective than traditional instruction in helping at-risk students learn social studies content, and macrocontext instruction is generally more effective in promoting long-term retention of this information. Results of the inference data provided preliminary evidence that knowledge from one domain is accessible for solving problems in another domain. (Three tables of data are included.) (MG)

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The Effects of Anchored Instruction for Teaching Social Studies: Enhancing Comprehension of Setting Information

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This paper describes some of the research findings from a project examining an experimental curriculum developed to enhance students' literacy and social studies skills. The effects of the curriculum on social studies skills will be the focus of this paper; Risko, Kinzer, Vye and Rowe (this symposium) and Rowe, Goodman, Moore and McLarty (this symposium) describe the research findings related to students' acquisition of comprehension and composition skills (also see Bransford, Vye, Kinzer & Risko, in press; Risko, Kinzer, Goodman, McLarty, Dupree & Martin, 1989).

The experimental curriculum uses videodisc and text materials to create what we we have called a "macrocontext" for learning. The term, "macro" is used because the context is shared by all students and because the context is sufficiently broad and rich to enable teachers to integrate instruction across traditional curricular areas (i.e., to teach comprehension, writing, social studies and science using the same materials and in the same time frame). Theoretically speaking, there are some important benefits of integrating instruction. One benefit is that knowledge and skills that are learned in this way may be more likely to be used later by students to help them solve problems. In other words, integrated instruction may help circumvent the problem of "inert" knowledge (Bereiter, 1984; Bransford & Vye, 1989). Researchers have suggested that knowledge often remains inert because students have not learned in what situations to apply their knowledge (Anderson, 1987; Simon, 1980). Furthermore, it has been suggested that the typical structure of curricula exacerbates the inert knowledge problem (Brown, Collins & Duguid, 1989). The message that students take away from a structure in which mathematics, science, social studies, and reading are taught in different time periods with different materials is that mathematics knowledge is relevant to mathematics problems in mathematics class, that social studies knowledge is relevant to social studies problems

in social studies class, and so forth. Indeed, this welding of knowledge to particular and inauthentic situations is probably even more specific; Bransford (1979) reports that many students know that the problems posed at the end of a chapter require application of the concepts and operations introduced in that chapter, and in large part select their solution procedures on the basis of this information, rather than on the basis of some more meaning-based criterion.

Integrated instruction may help overcome the problem of inert knowledge because it helps students understand that problems often require the application of knowledge from so-called different domains, and provides opportunities for students to acquire information about situations where a particular concept or skill is applicable. For example in our experimental curriculum, students watched (on video) and read many stories and were given training on drawing causal inferences about events in these stories. All of the stories were set in the era of Victorian England. Because of the common setting, and because some of the inferences need to comprehend the stories required knowledge of the historical time period, students studied texts describing the social conditions of that time and were encouraged to use this knowledge to help them make inferences about events in the stories. For example, in one of the stories, the mother of the heroine realizes that she needs one of her children to drop out of school and find a job to help support the family. The mother decides that her daughter should leave school, and that her son should remain there, even though the daughter has been more successful in school and clearly likes it much more than the son. Students in the experimental curriculum read texts describing education and womens' roles during the Victorian era, and were helped to use this knowledge to infer the motive behind the mother's actions

(i.e., an educated male would have greater opportunity for economic advancement later in life than would an educated female). By teaching social studies content in this way, we hope to help students understand its relevance for solving problems in other domains.

We have suggested that one important benefit of using a macrocontext is that it enables teachers to meaningfully integrate instruction across traditional subject areas, and in so doing may facilitate students' acquisition of non-inert knowledge. A related pedagogical benefit of integrated instruction is that it may facilitate initial learning of information. A number of researchers have argued that a major problem with social studies curricula is that content goals are often unclear; there do not appear to be coherent criteria for deciding what information to include (Beck & McKeown, 1988; Beck, McKeown & Gromoll; Voss, 1986). As a result, the causal/explanatory structure of the content is missing, and the text reads like a list of unrelated and oftentimes, abstract facts. This, in turn, puts student readers in the position of having to use their background knowledge to supply the missing structure (most often they do not have the needed background knowledge) or of having to rote memorize what appears to them to be a list of arbitrary facts.

In contrast, in integrated instruction the cross-curricular content is introduced as a tool to help students understand and solve problems. An example of information that serves as a tool is the situation described earlier where information about education practices and the status of women in Victorian England was introduced so that students could understand particular events in a story. When information is presented in this way, students are more likely to understand the function of the information they are learning, and to create a meaning-based mental representation of it. As a result, the information

may be easier to learn and better remembered.

As mentioned earlier, we used stories on videodisc as a major vehicle for creating the macrocontext in our experimental curriculum. The videos we selected were **The Young Sherlock Holmes** and **Oliver Twist**. Both of these are commercially-available, full-length movies. Our reasons for selecting video were several (see Bransford, Kinzer, Risko, Rowe & Vye, 1989; Cognition and Technology Group, in press; McLarty, Goodman, Risko, Kinzer, Vye, Rowe & Carson, 1989, for a detailed discussion of the advantages of video macrocontexts): One reason is that students often lack the background knowledge that is needed to create adequate mental representations or mental models (Johnson-Laird, 1983) of text. For example, if students are not familiar with Victorian England, it would be difficult for them to create a mental model of a story set in this time period. Constructing this mental model would require much of the students' mental processing resources, leaving less available for other aspects of the task and causing overall performance to suffer. Using video enables students to take a processing short-cut since video directly provides much of the information needed to create a mental model (see McNamara, Miller & Bransford, in press).

A second reason for using video is that because all students see the same video, there is a shared context for instruction. A major problem that teachers face when trying to find examples of concepts and when trying to relate concepts to something that students already know, is that that students bring different experiences with them to the classroom. Teachers cannot assume all students have had a particular experience. The video represents a shared experience that teachers can use to develop and/or illustrate concepts.

Helping students form mental models and establishing a shared context for instruction may be especially important for lower functioning students. These students are less skilled readers and are less likely to possess relevant background knowledge. Using video may help circumvent some of the problems that result from these skill deficiencies.

We have described some of the advantages of creating video macrocontexts that can be used to integrate instruction; we think that that they can obviate some of the problems associated with lack of background knowledge, will establish a meaningful context for learning, and will help avoid the problem of inert knowledge.

Thus far we have described the context of instruction and have only indirectly mentioned the nature of the instruction associated with this context. In general, the instruction was designed to promote a learning environment where students were actively involved in generating knowledge. We wanted to avoid creating an environment in which students were passive recipients of information and where the primary method of instruction was didactic and teacher-directed. Instead, teachers tried to create a climate of inquiry where students could learn from each other. To help them create this climate, teachers made frequent use of student-directed projects, small group activities and class discussions. The instruction is descibed below in greater detail.

Description of the Project

The curriculum evaluation project spanned a three year period. The social studies findings that are reported here were collected during the second and third years of the project.

Participants. The curriculum was implemented in several fifth grade classes in a middle school in a small southeastern city. The school demographics are representative of the demographics for the area at large; the school draws students from all SES levels, and approximately two thirds are White, and one third are Black.

During Year 2, two classes of students participated. One of the classes was comprised of students who were characterized by their teachers (the class was co-taught) as being at-risk of academic failure. The class was composed of low-achieving students, many of whom were from low SES home and/or single parent families. The at-risk students' mean percentile score on the Comprehension subtest of the Stanford Achievement Test was 53. The second class was composed of average achieving students from mostly middle class homes. The average students' mean percentile score on the Comprehension subtest was 62.

Students in each of the classes were assigned to either an experimental (i.e. macrocontext) or a comparison curriculum group. Assignment was conducted using stratified random procedures. Classes were taught by project staff.

During Year 3, three classes of fifth grade students participated and were taught by regular classroom teachers. Since the focus of the research during Year 3 was implementation of the curriculum, comparison classes were not included.

Schedule of Implementation. During Year 2 the curriculum was used for two hours twice a week from September through May. During Year 3 the curriculum was used for one hour three times a week from September through December.

Macrocontext Curriculum. The primary video macrocontexts were the movies **The Young Sherlock Holmes** (hereafter **Sherlock**) and **Oliver Twist** (hereafter **Oliver**). **Sherlock**

was the first movie to be introduced, **Oliver** was introduced at midpoint in the curriculum. These videos were selected because each contains a rich and authentic depiction of 19th century England, and each has a complex and interesting narrative. In addition, both movies represent important literary genres, characters, and authors. Because of this, we were able to introduce students to written stories by the same authors, in the same genre, and in the case of **Sherlock**, written stories that had some of the same characters. For example, students read Sherlock Holmes stories and other mystery stories. Students also studied the novel, **The Wolves of Willoughby Chase**, by Joan Aiken. This novel is set in Victorian England and is a riches-to-rags-to-riches story in the classic Dickens style. It contains a wealth of character description and setting information.

The context for instruction was a literary one, comprised of both video and text. Within this literacy context there were some common skill objectives that were developed and revisited. One major objective was the development of story comprehension skills (see Risko et al., this symposium, for a presentation of the story comprehension data). All stories were studied from the perspective of their causal event structure. After reading or watching a story, several class periods were spent reviewing the sequence of events and discussing how one event lead to the next. (Vocabulary were also introduced at this point. For a discussion of the results related to vocabulary, see Risko et al., 1989) The next major unit was devoted to character analysis. Students discussed character traits and motives, role-played the major characters and wrote character sketches. Finally, students studied plot structure (i.e. story grammar), analysed the story using this structure as a framework, and wrote stories using this framework. In the case of the video stories, these activities took as long as several months to complete. One reason why so much

time was devoted to these activities was that we wanted students to be experts on the material so that they could make comparisons with stories they later saw or read. For example, when discussing **Oliver**, students were encouraged to draw parallels between these characters and those in **Sherlock**.

Another major objective of the curriculum was to promote the development of composition skills. As mentioned above, composition activities were included as part of the character analysis and plot structure activities. In addition, during Year 2 (time was not available during Year 3) students published a class newsletter every month or so where students' written stories and other articles were published. An editorial board was appointed for each newsletter. The board's job was to edit submissions for the newsletter and provide feedback to the authors. Another forum for students' written work was the class library. Students were encouraged to write and publish stories in a book in the library. (The library contain videos and books related to the macrocontext.) One hour a week was set aside for students to work on articles for the newsletter and library.

The third major objective that was developed in the context of each of the videos and major texts was the acquisition of social studies skills. The focus was on the social conditions and technology of the time period. Social studies content was integrated with the comprehension and composition activities. During discussion of the stories, social studies readings were periodically introduced to help clarify events in the stories. For example, when the classes discussed **Oliver**, they were given expository readings on the living conditions of the lower classes, on education practices, and on criminal activity during this time. These readings were given to help students understand particular concepts and events in the story. For example, the readings helped students understand

why Oliver had to work and why he didn't go to school, what a workhouse was, and why there might have been roving gangs of pickpockets on the streets. Note that the social studies content was introduced as a tool for helping students understand stories. It is also likely that students' mental models of the living conditions depicted in **Oliver** helped them to comprehend the expository readings. In this way, the two worked together in a synergistic fashion.

Social studies content was integrated with the activities on character analysis. For example, after watching **Sherlock** and **Oliver,** and reading **The Wolves of Willoughby Chase**, students were given an activity in which they were asked to compare the lives of the main characters in each of these stories. Students were asked to consider similarities and differences in how these characters dressed, where they lived, how they were educated, and so forth. In other words, they were asked to think about each character in broad terms as representative of a given social class. Another activity involved having some students role-play characters and having the remaining students interview these characters on why they may have behaved in a certain way in the story, and to describe what it was like to live where they lived.

The curriculum integrated social studies and composition instruction through the newsletter. Students were encouraged to do research on aspects of the Victorian Era that interested them, and to publish their findings in the newsletter. Sometimes the topics of these reports came directly from class discussions. For example, one student wrote an article about English currency after a discussion in which students talked about what Oliver meant when he used the term "sixpence." Other topics represent a mapping of students' interests to the time period; one sports-minded student contributed an article

on the sports that were popular during the 18th century.

In addition to the above activities, the curriculum incorporated other activities that were designed to further develop students' mental models of the time period. To promote the development of pattern recognition skills, students were asked to play detective and search the movies for clues to their historical setting. Examples of clues are carriages, gaslights, workhouses, and types of clothing (e.g. tophats, crinolines, etc.). In another project, students were given the task of preparing a presentation explaining how turn of the century England had accomplished the task of increasing the average lifespan of members of her population. Students were asked to use what they had learned about living conditions and child labor laws, to read expository text on topics such as medical and technological advances and then to draw inferences about the effects of these factors on morbidity.

Comparison Group Curriculum. Students in the comparison groups received instruction at the same time and for the same duration as the experimental groups. The comparison groups were taught the same content as the other groups: The three general skill objectives were story comprehension (i.e. character analysis and story grammar), story composition and social studies skills. The major differences between the comparison and experimental curricula were that no videos were used and the comparison curriculum was not integrated. The literacy content was taught separately from the social studies content and was taught in a manner typical of basal readers; that is, different skills were introduced in the content of different stories. The social studies content was selected from commercially-available social studies curricula. The readings were identical to those used in the experimental classes. The comparison classes had

many of the same types of activities as the experimental classes. For example, the comparison groups published a class newsletter to which students could contribute articles on any topic that they wished, and similar to the experimental classes, the newsletter had an editorial board. There was also a special class library composed of a variety of books and videos. The comparison classes also engaged in small group activities and class presentations.

Assessments of Social Studies Knowledge and Skills. In Year 2, several measures of student learning were used: One measure (hereafter Knowledge test) was designed to assess students' knowledge of information related to the historical period. The test required that students write short essays on questions about living conditions, clothing, government, technology, the lives of children, to name a few. The Knowledge test was administered in late April at the end of the year's instruction.

At the same time as the Knowledge test was administered, two additional tests were given. These tests were designed to assess students' abilities to use their historical knowledge to draw inferences about events in narratives that they saw and read. In other words, these tests were designed to test whether students used their background knowledge to help them comprehend narratives. On both of the inference tests, students were asked to provide explanations for characters' behaviors. In each case, the explanation required knowledge of the historical period. For example, in one of the narratives, it mentions that the housemaid brought a bowl of warm water to her mistress' room. On the test, students were asked to explain why the housemaid did this. A corrrect answer in this case, would contain reference to the fact that it was for washing because there was no running water and very few indoor bathrooms. One inference test

related to a narrative on video (hereafter Video Inference test); the other related to a narrative in text form (hereafter Text Inference test).

The third test administered during Year 2 was given one month later during exit interviews with students and was designed to assess students' delayed memory for information related to the time period (hereafter Delayed Knowledge test). Questions were designed to assess students knowledge of social conditions and the lives of children.

During Year 3, the Knowledge test from Year 2 was administered prior to and immediately following instruction.

Results

Year 2

A primary rater scored the Knowledge, Video Inference, Text Inference and Delayed Knowledge tests; a secondary rater rescored a randomly selected sample comprised of 25% of the tests from each class. Inter-rater agreement exceeded 90% for all tests. The Knowledge test was comprised of 9 questions. The Delayed Knowledge test contained 2 of the 9 items from the Knowledge test. For each of these tests, one point was given for each correct idea unit contained in each question. The inference tests each contained 6 questions. The total maximum score on each inference test was 6.

A one-way ANOVA was conducted on students' total scores on the Knowledge test. The groups in the analysis were At-risk/Macrocontext, At-risk/Comparison, Average/Macrocontext and Average/Comparison. The main effect of group was significant ($F(3,67) = 7.38$, $p = .0002$). Apriori comparisons of the means indicated that the mean score for the At-risk/Macrocontext class was greater than the mean for the At-risk/Comparison class ($t(67) = 4.59$, $p < .025$). The difference between the

Average/Macrocontext and Average/Comparison means was not reliable ($t(67) = 0.8$, $p > .025$). The group means are presented in Table 1.

The results of the one-way ANOVA on students performance on the Delayed Knowledge test indicated a main effect of group ($F(3,64) = 3.56$, $p = .03$). Comparison of the treatment effect for the At-risk and Average classes revealed differences in performance in favor of the experimental groups ($t(64) = 2.33$, $p < .025$ and $t(64) = 2.06$, $p < .025$ for the At-risk and Average classes, respectively). Table 1 contains the group means for the Delayed Knowledge test.

The main effect of group was signifi t in the analysis of the Video Inference test scores ($F(3,64) = 2.76$, $p = .05$). There was a difference between the performance of the At-risk/Macrocontext and At-risk/Comparison classes, in favor of the experimental group ($t(64) = 2.45$, $p < .025$). Performance differences were not observed between the two classes of average students. Table 2 presents the group means for the Video Inference test.

The main effect of group was not reliable in the analysis of the Text Inference test scores ($F(3,59) = 1.78$, $p = .16$). None of the apriori t-tests revealed differences between the means ($t(59) = .47$ and $t(59) = 1.33$, for the At-risk and Average classes, respectively). Table 2 presents the class means for the Text Inference test.

Year 3

A primary rater scored the Knowledge test and a secondary rater rescored 25% of the sample. The raters agreed 92.2% of the time. As was the case with the Year 2 Knowledge test, one point was given for each correct idea unit contained in each question. The test contained 6 questions (3 of the questions from the Year 2 version were

not used on the Year 3 version).

A 2 X 3 mixed ANOVA was conducted on the Knowledge test scores. The variables were test (Pretest vs. Posttest) and Class (1, 2 or 3). The main effect of time ($F(1,68) = 154.63$, $p < .000$) and the interaction effect were significant ($F(2,68) = 19.4$, $p < .000$). The difference between the Pretest and Posttest scores was significant at the .01 level in each of the three classes ($t(68) = 3.69$, 5.7 and 12.14, for Class 1, 2 and 3, respectively). The group means are presented in Table 3.

Discussion

Generally, the results from Year 2 indicate that integrated instruction using macrocontexts had the greatest benefit on the lower achieving students. These students performed better than comparison students on the Knowledge and Delayed Knowledge tests and on the Video Inference test. The finding that lower achieving students benefitted the most is consistent with notion discussed earlier that video macrocontexts may be particularly effective for lower achieving students who are less likely to possess relevant background knowledge.

The results for the Average students revealed differences on the Delayed Knowledge test only. This suggests that there may be greater forgetting for students taught using a traditional approach than for students taught using a macrocontextual approach. The results are consistent with results from vocabulary measures collected during Years 1 and 2 of the project (see Risko et al., 1989). On several of our vocabulary measures, students in the experimental classes showed less forgetting than comparison classes on delayed tests of word definitions. The finding of greater "savings" for the experimental groups is consistent with the assumption that macrocontext instruction helps

students acquire an elaborate, conceptual understanding of the time period. In contrast, comparison students may have acquired a superficial, episodic understanding of the information as reflected in their pattern of relatively good immediate recall and poor longer term recall.

No treatment differences were obtained on the Text Inference test. The failure to find a difference with At-risk students is not consistent with the findings of the Video Inference test. The reason for the inconsistency is not clear. For example, it is not because the Text test is more difficult. To the contrary, the mean score on the Text test for the At-risk/Macrocontext group was about 45% as compared with 30% for the same group on the Video test. Nor does looking at students' responses to items on the two tests provide clues that might explain the pattern of results. Further research on these measures is needed to help clarify the obtained outcomes.

The results from Year 3 indicate that the effects are replicable across teachers and from experimental to field settings. Students in each of the three classes showed significant increases in their knowledge of the time period.

In summary, it appears that macrocontext instruction is relatively more effective than traditional instruction in helping at-risk students learn social studies content. In addition, the findings indicate that macrocontext instruction is generally more effective in promoting long term retention of this information. Finally, the inference test data provide preliminary evidence that following macrocontext instruction, knowledge from one domain is accessible for solving problems in another domain.

References

Anderson, J. R. (1987). Skill acquisition: compilation of weak-method problem solutions. Pscyhological Review, 94, 192-210.

Beck, I.L. & McKeown, M.G. (1988). Toward meaningful accounts in history texts for young learners. Educational Researcher, 17, 31-39.

Beck, I.L., McKeown, M.G., & Gromoll, E.W. (1989). Learning from social studies text. Cognition & Instruction, 6, 99-158.

Bereiter, C. (1984). How to keep thinking skills from going the way of all frills. Educational Leadership, 42, 75-77.

Bransford, J.D. (1979). Human cognition: Learning, understanding and remembering. Belmont, CA: Wadsworth Publishing Co.

Bransford, J.D., Kinzer, C., Risko, V., Rowe, D., & Vye, N.J. (1989). Designing invitations to thinking: Some initial thoughts. In S. McCormick, J. Zutell, P. Scharer & P. O'Keefe (Eds.) Cognitive and social perspectives for literacy research and instruction (pp. 35-54). Chicago, IL: The National Reading Conference.

Bransford, J.D. & Vye, N.J. (1989). A perspective on cognitive research and its implications for instruction. In L.Resnick & L Klopfer (Eds.) Toward the thinking curiculum: Current cognitive research (pp. 173-205). Alexandria, VA: ASCD

Bransford, J.D., Vye, N.J., Kinzer, C., & Risko, V. (in press). Teaching thinking and content knowledge: Toward an integrated approach. In B. F. Jones & L. Idol (Eds.) Dimensions of thinking and cognitive instruction (Vol. 1). Hillsdale, NJ: Erlbaum.

McLarty, K., Goodman, J., Risko, V., Kinzer, C., Vye, N.J., Rowe, D., & Carson, J. (1989). Implementing anchored instruction: Guiding principles for curriculum development. Paper presented at the meeting of the National Reading Conference, New Orleans, LA.

McNamara, T.P., Miller, D.L., & Bransford, J.D. (in press). Mental models and reading comprehension. In P.D. Pearson, R. Barr, M. Kamil & P. Mosenthal (Eds.), Handbook of reading research (Vol. 2). New York: Longman.

Risko, V., Kinzer, C., Goodman, J., McLarty, K., Dupree, A. & Martin, H. (1989). Effects of macrocontexts on reading comprehension, composition of stories and vocabulary development. Paper presented at the meeting of the American Educational Research Association, San Francisco, CA.

Simon, H. (1980). Problem solving and education. In D.T. Tuma & R. Reif (Eds.), Problem solving and education: Issues in teaching and research. Hillsdale, NJ: Erlbaum.

Voss, J.F. (1986). Social studies. In R.F. Dillon & R.J. Sternberg (Eds.) Cognition and Instruction (pp.205-239). Orlando, FL: Academic Press.

Table 1

Means Scores on Knowledge and Delayed Knowledge Tests (Year 2)

	Knowledge[1]	Delayed Knowledge[2]
At-risk/Macrocontext	19.67 (7.27)[3]	3.08 (1.61)
At-risk/Comparison	11.86 (4.14)	1.94 (1.66)
Average/Macrocontext	17.46 (5.93)	3.23 (1.69)
Average/Comparison	15.69 (3.68)	1.92 (1.38)

[1] Knowledge test is a 9-item test
[2] Delayed test is a 2-item test
[3] Numbers in parentheses are standard deviations

Table 2

Means Scores on Video and Text Inference Tests (Year 2)

Group	Video Inference[1]	Text Inference
At-risk/Macrocontext	1.70 (1.09)[2]	2.81 (1.83)
At-risk/Comparison	0.95 (0.84)	2.59 (1.54)
Average/Macrocontext	1.50 (1.25)	2.38 (1.19)
Average/Comparison	0.92 (0.73)	1.58 (1.00)

[1] The maximum score possible on each test is 6
[2] Numbers in parentheses are standard deviations

Table 3

Mean scores on Knowledge Text (Year 3)

Class	Pretest	Posttest
1	7.33 (3.34)[1]	11.17 (4.06)
2	6.26 (3.62)	12.30 (4.99)
3	4.04 (2.61)	16.67 (6.39)

[1] Numbers in parentheses are standard deviations